

INLAND NAVIGATION.

STAGE OF WATER IN RIVERS AND HARBORS.

The following table shows the danger-points at the various stations; the highest and lowest water for April, 1889, with the dates of occurrence and the monthly ranges:

Heights of rivers above low-water mark, April, 1889 (in feet and tenths).

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
Red River:						
Shreveport, La.	29.9		15 22.0	30	17.9	4.1
Arkansas River:						
Fort Smith, Ark. ...	22.0		23 13.2	14	5.1	8.1
Little Rock, Ark. ...	23.0	1-2	17.1	22, 23	8.4	8.7
Missouri River:						
Omaha, Nebr.	18.0	1	8.9	15	6.9	2.0
Leavenworth, Kans. ...	20.0	1	12.0	11	6.8	5.2
Kansas City, Mo. ...	21.0	4, 5	10.1	13, 14, 15, 16, 26	7.9	2.2
Mississippi River:						
Saint Paul, Minn. ...	14.5	30	3.8	21, 22	2.5	1.3
La Crosse, Wis.	24.0	1	5.3	19-23	3.7	1.6
Dubuque, Iowa	16.0	1, 2, 3	7.4	29	4.5	2.9
Davenport, Iowa	15.0	4, 5	5.3	29, 30	3.2	2.1
Keokuk, Iowa	14.0	20	6.8	29-30	3.6	3.2
Saint Louis, Mo.	32.0	24	16.3	13	9.3	7.0
Cairo, Ill.	40.0	25, 26	24.0	16	17.9	6.1
Memphis, Tenn.	34.0	1	19.0	19-20	14.2	4.8
Vicksburg, Miss.	41.0	4, 5	30.2	24	23.0	7.2
New Orleans, La. ...	13.0	14	11.2	29	8.5	2.7
Ohio River:						
Pittsburgh, Pa.	22.0	14	15.3	25	3.7	11.6
Parkersburg, W. Va. ...	38.0	16	19.6	26	6.9	12.7
Cincinnati, Ohio	50.0	19	26.9	26, 27, 29	14.0	12.9
Louisville, Ky.	25.0	20	10.1	28	6.8	3.3
Cumberland River:						
Nashville, Tenn. ...	40.0	16	18.1	28	6.2	11.9
Tennessee River:						
Chattanooga, Tenn. ...	33.0	20	8.2	13	3.2	5.0
Monongahela River:						
Pittsburgh, Pa.	29.0	14	15.3	25	3.7	11.6
Savannah River:						
Augusta, Ga.	32.0	16	16.0	30	8.5	7.5
Willamette River:						
Portland, Oregon ...	15.0	29	6.0	4	2.6	3.4

ICE IN RIVERS AND HARBORS.

The following reports relative to ice in rivers and harbors, and opening of navigation for the season, have been made by Signal Service observers:

Saint Mary's River.—Sault de Ste. Marie, Mich.: the river was reported open from here north, and as far south as Mud Lake, on the 8th. Floating ice in river, 9th, and 11th to 15th. Navigation was opened 17th. The steam barge "Mercer" was the first boat to depart for Lake Superior on the 17th, and the steam barge "Osceola," from Michigan for Duluth, passed here on the same day.

Mississippi River.—Saint Paul, Minn.: steamer "Sydney," from Saint Louis, Mo., arrived here at noon, 6th. She was the first through boat of the season.

Lake Ontario.—Oswego, N. Y.: schooner "Caroline March," from Port Hope, Columbia Co., Wis., arrived in this port 1 p. m., 4th, opening navigation for the season. Rochester, N. Y.: navigation was reported open, 18th.

Lake Huron.—Port Huron, Mich.: steam barge "Hall" arrived here on the morning of the 5th from Alpena, Mich. She was ten hours working her way through the ice, and sunk, from injuries received during the passage, as she reached the mouth of Black River. This was the first boat of the season to cross Lake Huron. Fort Gratiot Light was lighted for the first time this season on the 5th. The steamer "Atlantic" was reported fast in the ice near Lakeport, Mich., 7th; she was released on the 9th. 15th, the ice which had been driven out of the lake jammed at the Saint Clair flats to such an extent as to entirely stop navigation; the steamer "Al-

pena" becoming fast in the ice at that point. At Marine City a large fleet of vessels was ice bound, being unable to proceed south. The ice jam broke during the night of the 19th, and the vessels detained there moved out. Owing to the large number of vessels, and the haste to move out, several minor casualties occurred.

Thunder Bay.—Alpena, Mich.: steamer "Atlantic," from Detroit, Mich., arrived here, 5th; this being the first arrival of the season, navigation is considered fully opened.

Lake Erie.—Buffalo, N. Y.: 12th, steamer "Owego" cleared for Chicago, Ill., and navigation for the season is considered opened. The harbor was full of floating ice on the 4th, 9th, 11th, and 12th. The lake and harbor were free of ice, 25th. Cleveland, Ohio: navigation was opened on the 1st. Detroit, Mich., 5th: the lake is reported free of ice, and the boats of the Detroit and Cleveland Steam Navigation Company have resumed their regular trips for the season.

Lake Michigan.—Grand Haven, Mich.: navigation on the lake was resumed, 15th. Green Bay, Wis.: steamer "De Pere" arrived, 9.30 a. m., 8th, from Chicago. She was the first arrival of the season, and was also the first departure, leaving the same evening.

Lake Superior.—Marquette, Mich.: navigation opened, 21st. Duluth, Minn.: propeller "James Fisk, jr.," departed on the 18th for Buffalo, N. Y. She was the first departure of the season for the lower lakes. The steamer "Osceola," from Port Huron, Mich., arrived in this port 4.40 a. m., 20th. She was the first arrival of the season from the lower lakes.

HIGH TIDES.

Norfolk, Va.: during the storm of the 6-7th the northeasterly wind backed up the water into Chesapeake Bay and caused the tide to rise to an extraordinarily high point, flooding the lower streets in this city. The tide rose to a point higher than ever before seen here, being between six and seven feet higher than the ordinary high water mark, and twelve inches higher than the highest tide hitherto known—that during the great gale of August, 1879. The water was blown out of Albemarle Sound lowering the water in the canal until vessels got aground where they should have had two feet of water to spare. This was due to the gale being immediately followed by a strong westerly wind.—*Report of Branch Hydrographic Office, Norfolk, Va.*

Suffolk, Va.: the storm of the 6th was the fiercest and most destructive ever known in this section. The tide in the Nansemond River was unprecedented, and on the 7th the river extended over its banks on each side for a hundred yards or more. Considerable damage was done to wharf property and to goods stored in warehouses along river. The track of the Suffolk and Carolina Railroad along river was washed from the roadbed and considerably damaged.—*Richmond Dispatch*, 8th.

Hatteras, N. C.: a very high tide submerged Hatteras Island on the 7th, and water entered many houses. Trees were uprooted, fences demolished, and gardens ruined. It is stated that this tide was the highest that has occurred since Hatteras Inlet was cut out in 1846.

Cedar Keys, Fla.: high wind, with an extreme velocity of sixty miles per hour prevailed during the 14th. The wind caused the tide to rise very high, damaging many small craft, and floating away a considerable number of cedar logs from the saw mill yards.

High tides also occurred as follows: Cape Henry, Va., 8th, 15th, 16th; Norfolk, Va., 16th.

ATMOSPHERIC ELECTRICITY.

AURORAS.

The most notable auroral displays were reported on the 7th, when they were noted in New England, New York, Pennsyl-

vania; Ohio, and Dakota, and on the 27th, when they were observed in northern Illinois, Iowa, Minnesota, and Dakota. Auroras were reported as far south as southern Ohio. The